

Listing of the Claims

A listing of the claims with the status of each is set forth below:

1. (Currently Amended). A pipeline processing type shaping apparatus that calculates a transmission scheduling time for each input packet to said apparatus by performing pipeline processing by a pipeline processing portion which includes a plurality of processing blocks, said apparatus comprising:

a management memory that stores the most recent a latest scheduling time allocated to a packet, which has been processed by said pipeline processing portion, for each of packet flow identifiers;

a storage portion part that includes a plurality of internal registers, which are equal to the number of processing blocks in said pipeline processing portion, and each stores a number of packets and a total sum length of packets having the same packet flow identifier and currently being processed in said pipeline processing portion stores and manages a number of packets and a total sum length of packets currently being processed in said pipeline processing portion for each packet flow as flow information; and

a calculating part that calculates the transmission scheduling time of an input packet, being processed by to said pipeline processing portion, in accordance with the most recent referring to the latest scheduling time being managed by said management memory and packet length for which said input packet length and said total sum length of packets stored in said internal register corresponding to the same packet flow identifier as said input packet are added said total sum length of packets including own packet and other packets currently being processed in said pipeline processing portion.

2. (Currently amended) The pipeline processing type shaping apparatus according to claim 1, wherein the calculating part comprising:

a reading block that transfers a packet flow identifier of said input packet to said storage portion and receives said total sum length of packets stored in said internal register corresponding to the same packet flow identifier reads from the stored part the flow information of packet flow to which coincides with the packet

~~flow of the packet input to the pipeline processing portion; and~~

~~a calculating block that calculates the transmission scheduling time for said input of the packet input to said pipeline processing portion referring to the latest in accordance with the most recent scheduling time being managed by the management memory and packet length for which said input packet length and said total sum length of packets received by said reading block are added the flow information read by said reading block with adding a own packet length of the packet.~~

3. (Currently amended) The pipeline processing type shaping apparatus according to claim 1, wherein said storage portion further comprising:

a storage information update part that increments, in response to an input of packet to said pipeline processing portion, the number of packets and the total sum length of packets stored in one of said internal registers corresponding to a packet flow identifier of said input packet, the storage part for each of the packet flows in response to the input of a packet to the pipeline processing portion, and decrements, in response to an output of packet from said pipeline processing portion, the number of packets and the total sum length of packets stored in one of said internal registers corresponding to a packet flow identifier of said output packet the storage part for each of the packet flows in response to the output of a packet from the pipeline processing portion.

4. (Currently amended) The pipeline processing type shaping apparatus according to claim 23, wherein the said storage part has internal registers that are equal to the number of processing blocks of the pipeline processing portion further comprising:

~~, and each of the internal registers stores flow information of a packet that belongs to the same flow for which pipeline processing is being processed~~

a storage information update part that increments, in response to an input of packet to said pipeline processing portion, the number of packets and the total sum length of packets stored in one of said internal registers corresponding to a packet flow identifier of said input packet, and decrements, in response to an

output of packet from said pipeline processing portion, the number of packets and the total sum length of packets stored in one of said internal registers corresponding to a packet flow identifier of said output packet.

5. (Canceled)

6. (Currently amended) A pipeline processing type shaping method that performs the pipeline processing by a pipeline processing portion which includes a plurality of processing blocks for calculating a transmission scheduling time for each input packet to said pipeline processing portion, said method comprising:

storing, into a management memory, the most recent a latest scheduling time allocated to a packet, which has been processed by said pipeline processing portion, for each of packet flow identifiers;

managing and storing, into one of internal registers which are equal to the number of processing blocks in said pipeline processing portion, a number of packets and a total sum length of packets having the same packet flow identifier and currently being processed in said the pipeline processing portion for each packet flow as flow information; and

calculating the transmission scheduling time of a an input packet, being processed by input to-said pipeline processing portion, in accordance with the most recent referring to the latest scheduling time managed by said management memory and packet length for which said input packet length and said total sum length of packets stored in said internal register corresponding to the same packet flow identifier as said input packet are added being stored and said total sum length of packets including own packet and other packets currently being processed in said pipeline processing portion.

7. (Currently amended) The pipeline processing type shaping method according to claim 6, wherein the calculating step comprising:

reading said total sum length of packets stored in one of said internal registers corresponding to the same packet flow identifier as said input packet the flow information of packet flow which coincides with the packet flow of the

packet input to the pipeline processing portion; and

calculating the transmission scheduling time of said input the packet input to said pipeline processing portion referring to the latest in accordance with the most recent scheduling time managed by said management memory and packet length for which said input packet length and said total sum length of packets stored in said storing step and flow information read in said reading step are added with adding a own packet length of the packet.

8. (Currently amended) The pipeline processing type shaping method according to claim 6, further comprising:

incrementing, in response to an input of packet to said pipeline processing portion, the number of packets and the total sum length of packets being stored in one of said internal registers corresponding to a packet flow identifier of said input packet for each of the packet flows in response to the input of a packet to the pipeline processing portion; and

decrementing, in response to an output of packet from said pipeline processing portion, the number of packets and the total sum length of packets being stored in one of said internal registers corresponding to a packet flow identifier of said output packet for each of the packet flows in response to the output of a packet from the pipeline processing portion.

9. (Currently amended) The pipeline processing type shaping method according to claim 7 8, wherein the storage part has internal registers that are equal to the number of processing blocks of the pipeline processing portion and wherein each of the internal registers stores the flow information of a packet belonging to the same flow for which pipeline processing is being processed further comprising:

incrementing, in response to an input of packet to said pipeline processing portion, the number of packets and the total sum length of packets stored in one of said internal registers corresponding to a packet flow identifier of said input packet; and

decrementing, in response to an output of packet from said pipeline processing portion, the number of packets and the total sum length of packets

stored in one of said internal registers corresponding to a packet flow identifier of said output packet.

10. (Canceled)

11. (Currently amended) A recording medium that records a control program of a pipeline processing type shaping method that performs the pipeline processing ~~processing~~ by a pipeline processing portion which includes a plurality of processing blocks for calculating a transmission scheduling time for each input packet to said pipeline processing portion, said control program comprising:

storing, into a management memory, the most recent ~~a latest~~ scheduling time allocated to a packet, which has been processed by said pipeline processing portion, for each of packet flow identifiers;

managing and storing, into one of internal registers which are equal to the number of processing blocks in said pipeline processing portion, a number of packets and a total sum length of packets having the same packet flow identifier and currently being processed in the said pipeline processing portion for each packet flow as flow information; and

calculating the transmission scheduling time of the an input packet, being processed by input to said pipeline processing portion, in accordance with the most recent referring to the latest scheduling time managed by said management memory and packet length for which said input packet length and said total sum length of packets stored in said internal register corresponding to the same packet flow identifier as said input packet are added stored in said storing step and the flow information read in said reading step with adding a own packet length of the packet.

12. (Currently amended) The recording medium that records a control program of a pipeline processing type shaping method according to claim 11, where the control program of the calculating step comprising:

reading said total sum length of packets stored in one of said internal registers corresponding to the same packet flow identifier as said input packet the

flow information of packet flow which coincides with the packet flow of the packet input to the pipeline processing portion; and

calculating the transmission scheduling time of the an input packet, being processed by input to said pipeline processing portion, in accordance with the most recent referring to the latest scheduling time managed by said management memory and packet length for which said input packet length and said total sum length of packets read in said reading step are added stored in said storing step and the flow information read in said reading step with adding a own packet length of the packet.

13. (Currently amended) The recording medium according to claim 11, further comprising:

incrementing, in response to an input of packet to said pipeline processing portion, the number of packets and the total sum length of packets being stored in one of said internal registers corresponding to a packet flow identifier of said input packet for each of the packet flows in response to the input of a packet to the pipeline processing portion; and

decrementing, in response to an output packet from said pipeline processing portion, the number of packets and the total sum length of packets being stored in one of said internal registers corresponding to a packet flow identifier of said output packet for each of the packet flows in response to the output of a packet from the pipeline processing portion.

14. (Currently amended) The recording medium according to claim 12+3, further comprising:

wherein the storage part has internal registers that are equal to the number of processing blocks of the pipeline processing portion and wherein each of the internal registers stores the flow information of a packet belonging to the same flow for which pipeline processing is being processed

incrementing, in response to an input of packet to said pipeline processing portion, the number of packets and the total sum length of packets stored in one of said internal registers corresponding to a packet flow identifier of said input

packet; and

decrementing, in response to an output of packet from said pipeline
processing portion, the number of packets and the total sum length of packets
stored in one of said internal registers corresponding to a packet flow identifier of
said output packet.

15-18. (Canceled)